

NATURAL AND CULTURAL
RESOURCES
MANAGEMENT PROGRAM

AN ADDENDUM TO THE
NATURAL AND CULTURAL RESOURCES
MANAGEMENT PLAN

FOR

SAGUARO NATIONAL MONUMENT
TUCSON, ARIZONA

Prepared by
Saguaro National Monument
National Park Service
Department of Interior
Revision of December 1983

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MANAGEMENT PROGRAM

SUMMARY

This Management Program for Saguaro National Monument is a document that proposes management and research actions, which will implement the Natural and Cultural Resources Management Plan. The Plan outlines a general long-term program designed to provide for natural and cultural resource management and research. The Management Program however, proposes specific projects to be carried out, according to availability of funds, for five years, beginning with Fiscal Year 1983. The Management Program will be revised and updated annually as the need arises to add new management or research projects and to reevaluate priorities.

The Management Program that follows contains:

- A list of natural and cultural resources projects (see Table of Contents).

- An overview and needs statement including a description of anticipated accomplishments for Fiscal Years 1983 through 1987.

- A natural and cultural resources project programming sheet listing each project in relation to park priority, funding, and time scheduling for the five-year period.

- Natural and cultural resources project statements that serve as "blueprints" for proposed actions.

NATURAL RESOURCES OVERVIEW AND NEEDS

The natural resources of Saguaro National Monument comprise an outstanding example of the Arizona Upland subdivision of the Sonoran Desert. These natural resources include the last remaining example of a nearly pristine continuum of natural warm desert to mountain forest biotic associations in the Southwestern United States. A total of 71,400 acres of park land was declared as wilderness in order to maintain the singular, undisturbed resources. Saguaro is also one of the most accessible units of the Park System to a large and rapidly expanding metropolitan center (15th fastest growing city in the United States).

The objective of maintaining an equilibrium condition in the naturally evolved desert and montane ecosystems is being threatened by the absence of natural fires, feral animals and especially the multifarious problems associated with increasing human impacts from a metro area of well over one-half million people.

Major aspects of natural resources management are:

1. Human Impact Assessment
2. Fire Management
3. Horse Trail Rehabilitation
4. Monitor Saguaro populations, formerly grazed areas and vertebrate fauna

This plan presents a five year strategy of resources management, monitoring, and research to mitigate or reverse the effects of identified natural resource problems as listed in park priority on the project programming sheet.

HORSE TRAIL REHABILITATION

There are over 100 miles of unplanned, unmaintained horse trails in the lower cactus forest of the Rincon Mountain Unit. Where the trails cross arroyos or traverse steep gradients there has invariable been a severe gully erosion problem. Trail work will consist of environmental rehabilitation, general clean-up, rerouting of trails, and especially erosion control at the deep gullies.

HUMAN IMPACT ASSESSMENT

Rapidly increasing human impacts on the resources of both Units take numerous forms within an urban population of over one-half million people located mid-way between the two units of the park (the Rincon and Tucson Mountain Units). Opportunities for enjoyment of intended purposes of the park are diminished by growing intensive visitor use patterns. A systematic inventory and analysis needs to be conducted of physical facilities, sensitive biotic and cultural areas, and user attitudes, preferences, perceptions, and activities. Integration of these data will identify principal factors affecting individual and combined constraints leading to identification of sensitive use indicators (physical, biotic, cultural and

user resources). Following inventory and analysis of individual and collective constraints, management decisions based on National Park Service directives and policies will determine management actions.

FIRE MANAGEMENT

An Interim Fire Management Plan was implemented in July 1983. The Fire Ecology Study, SAGU-N-1 is nearing completion, and work is proceeding on the new Fire Management Plan, SAGU-RM-4.

MONITOR SAGUARO POPULATIONS, FORMERLY GRAZED AREAS AND VERTEBRATE FAUNA.

These monitoring programs developed as a result of the approved significant resource problem study FY 84 and 85. Appropriate project statements are SAGU-N-2, SAGU-N-3, SAGU-N-4, SAGU-N-5, SAGU-N-6 and SAGU-N-8.

ANTICIPATED ACCOMPLISHMENT OF FISCAL YEAR:

- FY-84 Mine Shaft Fencing, Fire Ecology Study and Feral Cattle Removal projects are being completed. A Fire Management Plan will be developed. Human Impact Assessment is progressing, and Vertebrate Fauna Monitoring is beginning.
- FY-85 New Fire Management Plan will be implemented. Human Impact Assessment will conclude. Monitoring of grazing plots, Saguaros, and vertebrate fauna will continue. Vegetation type map and vascular plant, Tucson Mountain Unit will begin, air quality monitoring for ozone will continue.
- FY-86 Management recommendations of Human Impact Assessment will be implemented. Water Resources Management Plan will be developed.
- FY-87 Horse Trail Rehabilitation will continue. Prescribed burning program will be expanded and refined. Monitoring programs will be continued.

NPS COSTS EXPRESSED IN \$1000

Saguaro National Monument
Project Programming Sheet
N/C RMP

Area Pri- ority	Refer- ence No.	Project Title	Yr. 1 BASE NEW	Yr. 2 BASE NEW	Yr. 3 BASE NEW	Yr. 4 BASE NEW	Yr. 5 BASE NEW	DATE
1	N-2	Human Impact Assessment RMU and TMU	24.0	24.0				07/83 on- going
2	RM-4	Fire Management Plan, RMU	6.0					12/83
3	RM-1	Horse Trail Rehabilitation and Resource Protection Lower Cactus Forest, RMU	54.9	54.9	54.9	54.9	54.9	03/82 on- going
4	N-3	Vegetation Type Map, RMU	5.0					12/83
5	N-4	Vertebrate Fauna Monitoring, RMU and TMU	4.0					12/83
6	N-4a	Wildlife Watering Feasibility Study (Response to CAP, TMU	1.0					12/83
7	N-5	Vegetation Analysis on Tanque Verde Grazing Allotment, RMU	4.0					12/83
8	N-6	Saguaro Population Monitoring, RMU and TMU	3.0					12/83
9	N-7	Vegetation Type Map and Vascular Plant Survey, TMU	20.0	20.0				11/82
10	A0-1	Air Quality Monitoring and Baseline Studies	13.5	13.5	13.5	13.5	13.5	04/82 on- going
11	W-1	Water Resources Management Plan RMU and TMU			12.0	8.0		03/83

NATURAL RESOURCES. PROJECT STATEMENT

1. PARK AND REGION: Saguaro National Monument, Western Region.
2. PROJECT NAME AND NUMBER: Human Impact Assessment, Park General, SAGU-N-2.

STATEMENT OF PROBLEM: Determination of deleterious impacts on areas where increased human pressures are most evident has become a major Saguaro National Monument management concern within the last decade. Analyses required for an appropriate determination are complex and require in-depth investigation into all aspects of human impact and activity. All of the following user type activities are increasing dramatically;

A. Backcountry Users - Rincon Mountain Unit.

1. Overnight backcountry hikers with permits.
2. Overnight backcountry hikers without permits.
3. Campers (1 and 2 above) with dogs and weapons, and campers who do not stay in designated sites.
4. Para-military groups (Citizens Defense Force) "TRAINING" with weapons and explosives.
5. Equestrian groups and individuals, both overnight and day use activities.
6. Hikers making day trips only.
7. Transient/indigent visitors who are non-resource oriented.
8. Cactus and animal poachers, rock-hounds, and pot-hunters.
9. Recreational runners (5 mountain marathons are held on trails annually).

B. Front Country Users - Rincon and Tucson Mountain Units.

1. Tucson Mountain Unit Commuter Traffic across the monument lands from Avra Valley.
2. Visitors using motorcycles, cars, trucks, recreational vehicles, and busses compete with one another for recreational experiences on scenic drives in both units.
3. On Cactus Forest Drive, At Rincon Mountain Unit, large numbers of bicyclists and runners interface with vehicles to reduce the quality of visitor experience for both groups.

4. Visitors who illegally feed wildlife along scenic drives and at picnic areas.
5. Visitor pets on and off leash, and free roaming dogs and cats from outside the boundaries of both units.
6. Horseback users on and off trails.
7. Motorized hang glider users.
8. Plant and animal poachers and pot-hunters.
9. Visitors who ignore entrance fees at Rincon Mountain Unit.
10. Visitors with non-resource oriented activities; such as, beer parties; frisbee, ball, and rock throwing contests; blaring radios; illegal drug users; sunbathing; love making; and other recreational uses.
11. Natural history and ecological investigators from universities and other governmental agencies.
12. Vandals who destroy the physical facilities, especially in the Tucson Mountain Unit.

4. WHAT HAS BEEN DONE:

- A. Development of a tourist incentive questionnaire in 1979 by the Arizona Office of Tourism.
- B. Tucson Mountain Unit visitor record keeping system was revised with assistance of Denver Service Center.
- C. Hourly baseline data for 1981 was collected on visitor vs. vehicle numbers at Rincon Mountain Unit.
- D. Visitor observation for interpretation records were maintained in 1979 and 1980 at Rincon Mountain Unit.
- E. Vehicular traffic counter statistics and backcountry use statistics are compiled annually.
- F. Horse counter statistics have been maintained since 1976 at five horse gates and at two locations on interior trails.

5. DESCRIPTION OF WORK TO BE UNDERTAKEN: A systematic inventory and analysis will be conducted of existing monument physical facilities (roads, trails, buildings); sensitive biotic and cultural areas; and user attitudes, preferences, perceptions, and activities. The integration of this data can be used to identify the principal factors affecting individual and combined constraints leading to the identification of sensitive use indicators; including physical, biotic, cultural, and user resources.

6. LENGTH OF TIME NEEDED: Two years.
7. WHAT WILL HAPPEN IF NOT UNDERTAKEN: Management decisions concerning human impact will lack valuable scientific and public input. Hiking and nature trails, backcountry campsites, picnic facilities, cultural resources, and various flora and fauna habitats may deteriorate as a result of increasing human impact.
8. WHAT ARE THE ALTERNATIVES:
 - A. Do not impose constraints on visitor use.
 - B. Impose visitor use limitations based on subjective opinions.
9. PERSONNEL: An interdisciplinary team comprised of Behavioral Scientists, and Resource Management Specialists.
10. ADMINISTRATION AND LOGISTICS: Monument staff and research personnel would work as a team to combine data showing ecological and social relationships for arriving at management decisions regarding human impacts and carrying capacities at Saguaro National Monument.

<u>Funding</u>	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Personal Services (Contract)	24,000	24,000	0	0	0
Other than Personal Services	0	0	0	0	0
Grand Total	24,000	24,000	0	0	0
Funds Available in Park Base	0	0	0	0	0
Funds requested from Regional Office	24,000	24,000	0	0	0

On Form

10-237

Date Submitted:

July 1983

11. REFERENCES AND CONTACTS:
 - A. Dr. Stanley K. Brickler, School of Renewable Natural Resources, University of Arizona.
 - B. Dr. R. Roy Johnson, Unit Leader, Cooperative National Park Resources Studies Unit, University of Arizona
12. DATE OF SUBMISSION: Revised July 1983

NATURAL RESOURCES. PROJECT STATEMENT

1. PARK AND REGION: Saguaro National Monument, Western Region
2. PROJECT NAME AND NUMBER: Fire Management Plan and Implementation of Initial Prescribed Burning, Rincon Mountain, SAGU-RM-4.
3. STATEMENT OF PROBLEM: In 1971, a natural prescribed fire plan was implemented at Saguaro. Data accumulated for over a decade indicate that the current prescription for natural prescribed fire cannot achieve the management goal of restoring fire to biotic communities of the Rincon Mountains. In addition, using prescribed burning is necessary to reduce hazardous fuels for the safety of people, structures, and biotic communities. Fire exclusion has created problems in the ecosystems by causing a trend toward minimizing plant diversity and the natural succession of vegetation following fires. Montane vegetation has evolved with fire, so it is an essential element in maintaining natural plant community composition along with climatic, geographic, and edaphic factors. Effective removal of fire for nearly three decades has led to heavy accumulation of fuels and alteration of fire related processes in all the biotic communities of the Rincon Mountains.

Monument wildlife has been adversely affected by the absence of fire because of less diversity of vegetation. Many animals are dependent upon conditions created by periodic fires with abnormal energy flow and food chains resulting from the absence of fires.

4. WHAT HAS BEEN DONE: An Interim Fire Management Plan went into effect in July 1983.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: Fire Mangement actions will enable the Fire Management Plan to be revised, based on the fire ecology study, Project Statement SAGU-N-1. The study will identify and relate biotic communities to fire, ascertain fuel loads, indicate long-term fire history, and define wildlife benefits.
6. LENGTH OF TIME NEEDED: Long-term project.
7. WHAT WILL HAPPEN IF NOT UNDERTAKEN: Fuel accumulations, already high in most montane biotic communities of the Rincons, will increase and may enventually be the cause of very hot fires that could be difficult or impossible to suppress. Natural fire will be excluded from the biotic communities, and adverse effects on wildlife will continue with less habitat diversity, or complete destruction of habitat by holocaustic fires.
8. WHAT ARE THE ALTERNATIVES:
 - A. Do not suppress any fires.
 - B. Suppress all fires.

C. Continue to use the approved natural prescribed fire plan.

9. PERSONNEL: Monument staff, Regional Specialists, U. S. Forest Service Staff, and University Specialists.

10. ADMINISTRATION AND LOGISTICS:

<u>Funding</u>	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Personal services	6,000				
Other than personal services			0	0	0
Grand total	6,000				
Funds available in park base		0	0	0	0
Funds requested from Regional Office	6,000				
<u>On Form</u>	<u>Date Submitted:</u>				
10-237	December 1983				

11. REFERENCES AND CONTACTS:

- A. Dr. R. Roy Johnson, Unit Leader, Cooperative National Park Resources Studies Unit, University of Arizona.
- B. Kathleen M. Davis, Plant Ecologist, Grand Canyon National Park
- C. Robert F. Wagle, Fire Ecologist, University of Arizona.
- D. Area Management Plan for prescribed Natural Fire.
- E. United States Forest Service Plan for natural prescribed fire in the Rincons.
- F. Fire Atlas, Rincon Mountains.
- G. Tom Gavin, Plant Ecologist, Western Regional Office
- H. Lynn Thomas, FMO, Santa Catalina Ranger District.
- I. Steve Plevel, District Ranger, Santa Catalina District, Coronado National Forest.

12. DATE OF SUBMISSION: Revised December 9, 1983.

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Saguaro National Monument, Western Region
2. PROJECT NAME AND NUMBER: Horse Trail Rehabilitation and Resource Protection, Lower Cactus Forest, Rincon Mountain Unit, SAGU-RM-1.
3. STATEMENT OF PROBLEM: Over 100 miles of unplanned, unmaintained horse trails now exist in the lower cactus forest. Gulley erosion ranges from moderate to severe on trails crossing slopes. Many trails were originally meandering "cowpaths" during the grazing era before 1958, the year grazing ended in the lower cactus forest. Sheet and gulley erosion of soils and unnatural vegetation mosaics gradually developed over many decades, beginning in the latter part of the nineteenth century with grazing. Scarcity of young saguaros, before the 1960's, is also a legacy of the grazing. An appearance of young plants, since cattle were removed, is dramatic evidence of the multifarious impacts of grazing on the desertscrub biotic community. The trails east of the Speedway horse gate receive the most intensive horse use, due to the proximity of the Tanque Verde Guest Ranch. Douglas Spring Trail receives major impacts of both horses and hikers and is very severely eroded.
4. WHAT HAS BEEN DONE:
 - A. "Trail Rehabilitation has been on-going for two years."
 - B. A horse use impact study by monument personnel in 1977 and 1978 could not be used to establish carrying capacities or limit use because the data was not scientifically valid.
 - C. Horse trails were inventoried in 1979 by Office of Arid Land Studies, University of Arizona.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: Trail work will consist of clean-up and environmental rehabilitation, rerouting of trails, and erosion control and prevention measures. Also, it will be important to define an aesthetically acceptable trail system by working directly with the Saguaro Horsemen's Association and Tanque Verde Guest Ranch. Present horse use levels can be accommodated on most existing trails with horseback riders receiving a diversified, quality experience. It is of primary importance that initial rehabilitation work to stop the accelerating gulley erosion of horse trails at arroyo crossings be undertaken soon.

Any new horse trail construction will only be accomplished to circumvent archeological sites, or at the steep arroyo crossings where numerous stirrup-deep gulleys have formed.

Trail construction will incorporate gentle gradients, in order to prevent or mitigate further erosional degradation. Natural material at trail construction sites will be used.

Ranger patrols to deter misuse of the resource and to contact horseback riders is also necessary.

6. LENGTH OF TIME NEEDED: Long-term project.

7. WHAT WILL HAPPEN IF NOT UNDERTAKEN: Horse trails will continue to erode. Complaints by hikers/runners, who share the Douglas Springs Trail with horses, will increase as the gulley erosion worsens. Trail rehabilitation work and patrols would demonstrate good faith in efforts to protect the resource. Failure to perform basic patrols and repair trail damage is weakening the Service stance in that the park discusses it's problems, but does nothing to improve the deteriorated trails.

8. WHAT ARE THE ALTERNATIVES:

A. No action.

9. PERSONNEL: Monument staff.

10. ADMINISTRATION AND LOGISTICS:

<u>Funding</u>	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Personal Services	54,900	54,900	54,900	54,900	54,900
Other than Personal Services	0	0	0	0	0
Grand Total	54,900	54,900	54,900	54,900	54,900
Funds available in Park Base	0	0	0	0	0
Funds requested from Regional Office	54,900	54,900	54,900	54,900	54,900

On Form:

10-237

Date Submitted:

April 1982

11. REFERENCES AND CONTACTS:

A. Dr. R. Roy Johnson, Unit Leader, Cooperative National Park Resources Studies Unit, University of Arizona.

12. DATE OF SUBMISSION: March 31, 1982.

NATURAL RESOURCES. PROJECT STATEMENT

1. PARK AND REGION: Saguaro National Monument, Western Region.
2. PROJECT NAME AND NUMBER: Vegetation Type Map, Rincon Mountain Unit, SAGU-N-3.
3. STATEMENT OF PROBLEM: Accurate knowledge of vegetation types, and biotic communities, in the Rincon Mountains is essential to the fire ecology study (SAGU-N-1) and the development of a fire management plan (SAGU-RM-4). This knowledge is also necessary for wildlife management and visitor use decision making and for interpretive purposes. The mapping is needed to measure future environmental changes in species composition and species evolution. Two vascular plant surveys currently underway in the Rincon Mountain Unit will become much more valuable when synchronized with a vegetation type map.
4. WHAT HAS BEEN DONE: The National Park Service Branch of Forestry, Civilian Conservation Corp, and Works Projects Administration produced a vegetation type map of the Rincon Mountains in 1937. The survey has limited usefulness now because of climatic changes, grazing, fire suppression, and some large wildfires. Vascular plants of the Rincon Mountains are currently being surveyed under research grants by the Cooperating Natural History Association (Southwest Park & Monuments Association).
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: Utilize remote sensing techniques involving ground-truthing, color photography, and mapping at a scale of 1:24,000.
6. LENGTH OF TIME NEEDED: One year.
7. WHAT WILL HAPPEN IF NOT UNDERTAKEN: Resource management decisions on fire and wildlife will have to be based on inadequate or outdated knowledge. Accurately quantifying and qualifying environmental changes will be impossible. Lack of baseline data, including species diversity, composition, density, and successional dynamics will be a constraint on Fire Management Program decision, Resource Management Project Statement (SAGU-RM-4). Wildlife habitats will not be delineated, since the biotic communities will not be accurately defined.
8. WHAT ARE THE ALTERNATIVES:
 - A. Do nothing.
 - B. Base fire management actions (prescribed burns) on the fire ecology study (SAGU-N-1) without the aid of current knowledge on vegetation types. Utilize the outdated 1937 vegetation type map.
9. PERSONNEL: Remote Sensing, Office of Arid Land Studies, University of Arizona.

10. ADMINISTRATION AND LOGISTICS:

<u>Funding</u>	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Personal Services	0	0	0	0	0
Other than Personal Services	5,000	0	0	0	0
Grand Total	5,000	0	0	0	0
Funds Available in Park Base	0	0	0	0	0
Funds requested from Regional Office	5,000	0	0	0	0

On Form

Date Submitted:

10-237

December 1983

11. REFERENCES AND CONTACTS:

- A. Blumer, J. C. 1910. A Comparison Between Two Mountain Sides, The Plant World.
- B. Humphrey, R. R. 1960. Forage Production on Arizona Ranges; Pima, Pinal and Santa Cruz Counties.
- C. Kearney, T. H. and R. H. Peebles. 1960. Arizona Flora. U. Cal Press, Berkeley, CA. 2nd Ed.
- D. May, Larry A. 1970. Vegetation Type Map of Tucson Mountain Unit of Saguaro National Monument.
- E. Marshall. 1956. Summer Birds of the Rincon Mountains, Saguaro National Monument. The Condor, Vol 58, March-April 1956.
- F. Dr. Charles Mason University of Arizona Botanist, Taxonomist and Herbarium Curator.
- G. Dr. Kim Mortensen, Office of Arid Land Studies, University of Arizona.
- H. Dr. David Mouat, Director, Remote Sensing Program, Office of Arid Land Studies, University of Arizona.
- I. Roseberry, R. D. and N. E. Dole. 1937. The Vegetation Type Survey of Saguaro National Monument.
- J. Steenbergh, W. F. 1967. Preliminary Checklist of the Cacti of the Rincon Mountain Unit of Saguaro National Monument.

K. Shreve, F. and I. L. Wiggins.. 1964. Vegetation and Flora of the Sonoran Desert.

L. Unit Leader, CPSU/UA.

M. Turner, R. M. 1974. Map Showing Vegetation in the Tucson Area.

N. Wadleigh, Richard 1969. Plant Lists for Rincon and Tucson Mountain Unit of Saguaro National Monument.

12. DATE OF SUBMISSION: December 9, 1983.

NATURAL RESOURCES-PROJECT STATEMENT

1. PARK AND REGION: Saguaro National Monument, Western Region.
2. PROJECT NAME AND NUMBER: Vertebrate Fauna Monitoring, Rincon Mountain Unit and Tucson Mountain Unit, SAGU-N-4.
3. STATEMENT OF PROBLEM: The highly diverse biotic communities of the monument support a vertebrate fauna about which little is known regarding seasonal distribution and abundance of present vertebrate populations. Cattle grazing, fire suppression, and human encroachment on lands adjacent to the monument have altered the natural biotic communities and their dependent fauna. Data concerning vertebrates, past and present, is essential to identify problem areas needing detailed ecological analysis.
4. WHAT HAS BEEN DONE: Observation records have been maintained since Saguaro National Monument was established. Current checklists have been maintained on birds and large mammals, and extensive research has been conducted on heteromyid rodents. An extensive wildlife monitoring project in the Tucson Mountains is currently underway by the Arizona Game and Fish Department, and will result in an Environmental Impact Statement for the Central Arizona Project in June, 1982.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: A long-term monitoring project is needed to map changes in distribution and abundance of monument's vertebrate populations. Studies will lead to recommendations for management of locally rare species. Very little is known about populations of tree-squirrels, turkeys, white-tail deer, black bear, and coati-mundi. A historic overview of fauna history should be included in this project. Successful breeding of exotic lizards in King Canyon in the Tucson Mountain Unit have been reported and needs investigation. The initial planning and set-up of transects would cost considerably more than the routine annual monitoring operation.
6. LENGTH OF TIME NEEDED: Long-term project.
7. WHAT WILL HAPPEN IF NOT UNDERTAKEN: Knowledge of vertebrate species will be incomplete for interpretive purposes and for compliance with the Endangered Species Act of 1973. Management's decisions regarding visitor use and impacts, and the fire management program will be based on limited knowledge with possibly unforeseen adverse consequences to certain vertebrate species. Growing visitor contact with front country fauna, such as Javelina, are having deleterious impacts on the animals. Free roaming dogs in both units and snake collecting in the Tucson Mountain Unit are having deleterious impacts. Tucson's population growth will affect the monument's fauna more severely with each passing year.
8. WHAT ARE THE ALTERNATIVES:
 - A. Do nothing
 - B. Base decisions on information collected at random.

9. PERSONNEL: Monument staff and contract to be coordinated through Unit Leader, Cooperative National Park Resources Studies Unit, University of Arizona.

10. ADMINISTRATION AND LOGISTICS:

<u>Funding</u>	<u>1st</u>	<u>2nd</u>	<u>Year in Program Sequence</u>			
			<u>3rd</u>	<u>4th</u>	<u>5th</u>	
Personal Services .	4,000					
Other than Personal Services	0					
Grand Total	4,000					
Funds available in Park Base	0	0	0	0	0	
Funds requested from Regional Office	4,000					

On-Form

10-237

Date Submitted:

December 1983

11. REFERENCES AND CONTACTS:

- A. Dr. R. Roy Johnson, Unit Leader, Cooperative National Park Resources Studies Unit, University of Arizona.
- B. Dr. Lyle K. Sows, University of Arizona, Cooperative Wildlife Research Unit, University of Arizona.
- C. Dr. E. Lendell Cockrum, Mammalogist, University of Arizona.
- D. Rincon Mountain Unit and Tucson Mountain Unit wildlife observations records.

12. DATE OF SUBMISSION: December 9, 1983

NATURAL RESOURCES- PROJECT STATEMENT

1. PARK AND REGION: Saguaro National Monument, Western Region.
2. PROJECT NAME AND NUMBER: Wildlife Watering Feasibility Study, Tucson Mountain Unit, SAGU-N-4a.
3. STATEMENT OF PROBLEM: Arizona Game and Fish Department Research indicates man-made water sources might be essential to maintaining current large mammal populations in the Tucson Mountain Unit, because of growing urban impacts and the proposed Central Arizona Project Canal along the west boundary of the Unit. The feasibility of permanently rehabilitating old man-made water sources needs to be evaluated to clarify relationship's of the man-made sources to the future needs of large mammals.
4. WHAT HAS BEEN DONE: Arizona Game and Fish Department Biologists have conducted a wildlife inventory for the Bureau of Reclamation to quantify impacts of the proposed Central Arizona Project Canal. The inventory report make the following points regarding wildlife and water: (1) Wildlife movements can be manipulated by placement of water, and (2) where water is limited, wildlife populations can be improved by placement of water sources.

Artificial water sources in the Tucson Mountains were constructed by the Civilian Conservation Corps in the late 1930's and early 1940's. They have not been used since the 1960's.

5. DESCRIPTION OF WORK TO BE UNDERTAKEN: Reservoirs and watering ponds at Dobie House and Red Hills Wells need minor rehabilitation. Once functional, the locations need to be monitored to ascertain effectiveness in attracting large mammals and keeping them from migrating to suburban areas and areas to the west of the proposed Central Arizona Project Canal route. These are intended as seasonal water sources (not to be used on a year round basis) available during periods of drought.
6. LENGTH OF TIME NEEDED: Three years.
7. WHAT WILL HAPPEN IF NOT UNDERTAKEN: The closing of access to traditional water sources and habitat west and north of the monument will cause mule deer to attempt to drink in the canal as well as cross it and would likely result in high incident of drowning. Also, all large mammal will seek water in suburban areas with resulting man/wildlife conflicts and complaints.

Saguaro National Monument would most likely be criticized for not taking action to mitigate wildlife drownings and the man/wildlife interactions on developed land surrounding the monument.

The monument may not be complying with wildlife management policy if mitigation is not provided to perpetuate wildlife.

8. WHAT ARE THE ALTERNATIVES:

- A. Do nothing.
- B. Rehabilitate man-made water sources without monitoring them.

9. PERSONNEL: Monument staff in conjunction with personnel from the Arizona Department of Game and Fish .

10. ADMINISTRATION AND LOGISTICS:

<u>Funding</u>	<u>1st</u>	<u>2nd</u>	<u>Year in Program Sequence</u>		
			<u>3rd</u>	<u>4th</u>	<u>5th</u>
Personal Services	1,000	1,000	1,000		

(Refer to new 10-237, continue Resource Management Monitoring Programs and undertake prescribed fire applications submitted 12/09/83).

Other than Personal	0
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Services

(Funding may also be derived through Central Arizona Project mitigation programs required in Central Arizona Project Environmental Impact Study).

On-Form

Date Submitted:

10-237

December 1983

11. REFERENCES AND CONTACTS:

- A. Jim de Vos, Arizona Game and Fish Department.
- B. Dr. Lyle T. Sowles, Cooperative Wildlife Research Unit, University of Arizona.
- C. Dr. R. Roy Johnson, Unit Leader, CPSU/UA.
- D. Dr. Robert Hall, RM Specialist, SOAR/SAGU.

12. DATE OF SUBMISSION: December 22, 1983

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Saguaro National Monument, Western Region.
2. PROJECT NAME AND NUMBER: Vegetation Analysis on Tanque Verde Grazing Allotment, SAGU-N-5.
3. STATEMENT OF PROBLEM: Livestock grazing ended on Tanque Verde Allotment in May, 1978. Natural regeneration of native vegetation and such exotics as lovegrasses and natal grass is starting in this area where the condition of the vegetation and soils has been substantially altered.
4. WHAT HAS BEEN DONE: Baseline data was collected on 10 study plots during the spring of 1976.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: The study plots need to be resurveyed and analyzed at 10 year intervals.
6. LENGTH OF TIME NEEDED: Four months for data collection and analysis.
7. WHAT WILL HAPPEN IF NOT UNDERTAKEN: Management will not know the plant species composition and recovery rate of vegetation in the area. If historic information is not available to document the recovery rate, future management decisions, such as use of fire, will not be based on scientific data.
8. WHAT ARE THE ALTERNATIVES:
 - A. Do not resurvey.
 - B. Shorten or extend the intervals between surveys.
9. PERSONNEL: Contract, University of Arizona based scientists.
10. ADMINISTRATION AND LOGISTICS: The surveys will be coordinated through the Unit Leader, Cooperative National Park Resources Studies Unit, University of Arizona.

<u>Funding</u>	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Personal Services	4,000	0	0	0	0
Other than Personal Services	0	0	0	0	0
Grand Total	4,000				
Funds available in park base	0	0	0	0	0
Funds requested from Regional Office	4,000				

On Form

10-237

Date Submitted:

December 1983

11. REFERENCES AND CONTACTS:

A. Dr. R. Roy Johnson, Unit Leader, Cooperative National Park Resources Studies Unit, University of Arizona.

B. Area files containing baseline data.

12. DATE OF SUBMISSION: December 9, 1983

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Saguaro National Monument, Western Region.
2. PROJECT NAME AND NUMBER: Saguaro Population Monitoring (SAGU-N-6).
3. STATEMENT OF PROBLEM: Knowledge of the status and trend of saguaro cactus populations in characteristic and topographically dissimilar habitats provides a measure of the effect of climatic change, and is necessary for management decisions and interpretation.
4. WHAT HAS BEEN DONE: Ten saguaro population study plots (4 in Tucson Mountain Unit, 6 in Rincon Mountain Unit) were established in 1975 to monitor long-term historic status and subsequent trend of the populations; thus establishing a basis for predicting the future conditions of these populations.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: Monitor the study plots at ten year intervals. The first ten year resurvey and analysis should be scheduled for FY 1985.
6. LENGTH OF TIME NEEDED: This is a long-term investigation.
7. WHAT WILL HAPPEN IF NOT UNDERTAKEN: Management and interpretive information will be lacking on this key natural resource of the park.
8. WHAT ARE THE ALTERNATIVES:
 - A. No Action.
 - B. Use available data.
9. PERSONNEL: Monitoring will be accomplished under contract by University of Arizona based scientists under the direction of the Unit Leader, Cooperative National Park Resources Studies Unit, University of Arizona.
10. ADMINISTRATION AND LOGISTICS:

<u>Funding</u>	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Personal services	3,000	0	0	0	0
Other than Personal Services	0	0	0	0	0
Grand Total	3,000				
Funds available in park base:	0	0	0	0	0
Funds requested from Regional Office	3,000	0	0	0	0

On Form

Date Submitted:

10-237

December 1983

11. REFERENCES AND CONTACTS:

- A. Dr. R. Roy Johnson, Unit Leader, Cooperative National Park Resources Studies Unit, University of Arizona
- B. Dr. Raymond M. Turner, Research Botanist, U. S. Geological Survey, Tucson, Arizona
- C. Dr. Stanley M. Alcorn, Plant Pathologist, University of Arizona
- D. Publications of the Desert Botanical Laboratory, 1903-1940.
- E. Bibliography: The Saguaro Giant Cactus, by Warren F. Steenbergh, Research Scientist, Saguaro National Monument, 1974.

12. DATE OF SUBMISSION: December 9, 1983

NATURAL RESOURCES. PROJECT STATEMENT

1. PARK AND REGION: Saguaro National Monument, Western Region.
2. PROJECT NAME AND NUMBER: Vascular Plant Survey and Vegetation Type Map, Tucson Mountain Unit (TMU). SAGU-N-7.
3. STATEMENT OF PROBLEM: Accurate knowledge of the composition, abundance and distribution of the vascular flora in the Tucson Mountain Unit is essential for making wise decisions about resources management and rapidly increasing visitor use. The mapping will be needed to measure future environmental changes caused by climate and mans activities, and will indicate future changes in species composition and species evolution. Identification of vascular flora is also necessary for compliance with the Endangered Species Act, and to determine critical habitat. A plant currently listed as Category I (threatened and endangered species) occurs in the unit.
4. WHAT HAS BEEN DONE: A generalized vegetation map of the Tucson Mountain Unit was produced in 1970, based on an aerial survey of 1966. A hypothetical plant check list was compiled in 1969.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: Utilize remote sensing techniques involving ground truthing, color photography and mapping at a scale of 1:24,000. Determine the composition, abundance and distribution of the vascular flora in both sections of the monument. Vegetation communities will be mapped to permit future environmental changes to be identified during follow-up monitoring. A survey of all vascular plants in the unit will be conducted to identify native and exotic species and for compliance with the Endangered Species Act.
6. LENGTH OF TIME NEEDED: Two years.
7. WHAT WILL HAPPEN IF NOT UNDERTAKEN: Endangered species may be inadvertently destroyed. Some resource management decisions may be based on inadequate information. Accurately quantifying and qualifying environmental changes will be impossible. Lack of baseline data, including species diversity, composition, density and successional dynamics will not be delineated since the parameters of the vegetation communities will remain unknown. Interpretation of the biotic communities will remain inaccurate, and the plant checklists will remain hypothetical.
8. WHAT ARE THE ALTERNATIVES:
 - A. Do not conduct the mapping and survey.
9. PERSONNEL: Contract.

10. ADMINISTRATION AND LOGISTICS:

<u>Funding</u>	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Personal services	0	0			
Other than personal services	20,000	20,000			
Grand Total	20,000	20,000			
Funds available in park base	0	0			
Funds requested from Regional Office	20,000	20,000			

On Form

Date Submitted:

10-237

November 10, 1982

11. REFERENCES AND CONTACTS:

- A. Monument Staff.
- B. Unit Leader CPSU/UA.
- C. May, Larry A. 1970. Vegetation Type Map of Tucson Mountain Unit of Saguaro National Monument.
- D. Dr. R. M. Turner, 1974. Vegetation Map of the Tucson area.
- E. Wadleigh, Richard, 1969. Hypothetical Plant List of the Tucson Mountain Unit.
- F. Dr. Charles Mason, University of Arizona Botanist, Taxonomist and Herbarium Curator.

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Saguaro National Monument, Western Region
2. PROJECT NAME AND NUMBER: Air quality Monitoring, SAGU-AQ-1.
3. STATEMENT OF PROBLEM: Air Quality related values, such as visibility of panoramas within the park, and long-range vistas outside the park are primary attractions essential to visitor enjoyment of the natural resources. Air pollution of the Tucson Basin and surrounding inter-montane valleys is readily discernable most days of the year from vistas in both the Rincon and Tucson Mountain Units.

The Tucson Air Planning Area is currently classified by the State of Arizona as non-attainment area for carbon monoxide and particulates. In the foreseeable future the Tucson Air Planning Area may become a non-attainment area for oxidants (ozone). In 1981, the EPA standard of .12 PPM in one hour average concentration occurred often in downtown Tucson, but was not exceeded.

Urban areas of over one-half million population, such as Tucson, may have oxidant levels which can cause vegetation damage (reduced growth with and without symptoms). In Tucson, the damage caused by ozone in combination with other photochemical oxidants (PAN) has not been determined.

Southern Arizona Copper smelters emit sulfur dioxide which eventually forms various sulfates and reaches the monument, but concentrations are so low that vegetation damage would not be expected. The smelters are exempt from requirements for installation of BART (Best Available Retrofit Technology), to prevent impairment of visibility in Class I areas.

4. WHAT HAS BEEN DONE: Nothing. *O₃ monitor has been installed*

5. DESCRIPTION OF WORK TO BE UNDERTAKEN:

- A. Obtain and install an ozone monitor.
- B. Develop an agreement with the Pima County Air Quality Control District for calibration and precision testing of monitor. *done*
- C. Operate the monitoring equipment.
- D. If possible, ascertain any vegetation damage from pollutants. *done*

6. LENGTH OF TIME NEEDED: Long-term project.

7. WHAT WILL HAPPEN IF NOT UNDERTAKEN: Changes in air quality will be undetermined. Possible vegetation damage may go undetected.

8. WHAT ARE THE ALTERNATIVES:

- A. Do nothing and rely on data from Pima County Air Quality Control District.
 - B. Contract for Pima County Air Quality Control District to provide monitoring equipment in the monument.
 - C. Monument personnel to monitor ozone with training and assistance from the Pima County Air Quality Control District.
9. PERSONNEL: Pima County Air Quality Control District Technicians and Monument staff.
10. ADMINISTRATION AND LOGISTICS: Western Regional Office to provide ozone monitoring equipment and Pima County Air Quality Control District to assist in calibration and precision testing.

<u>Funding</u>	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Grand Total	13,500	13,500	13,500	13,500	13,500

On Form:

10-237

Date Submitted:

April 1982

11. REFERENCES AND CONTACTS:

- A. Bill Mount, Chemist, Pima County Air Quality Control District.
- B. Dr. James P. Bennett, Environmental Specialist, Denver Service Center.
- C. Donald N. Christensen, Regional Air Quality Coordinator, Western Regional Office.
- C. Dr. Roger Caldwell, Plant Pathologist, University of Arizona.

12. DATE OF SUBMISSION: March 30, 1982.

NATURAL RESOURCES- PROJECT STATEMENT

1. PARK AND REGION: Saguaro National Monument, Western Region
2. PROJECT NAME AND NUMBER: Water Resources Management Plan, SAGU-W-1.
3. STATEMENT OF PROBLEM: In compliance with Public Law 92-500, (Federal Water Pollution Control Act) and as amended by Public Law 95-217 (Clean Water Act of 1977) and as furthered by the Service Memorandum of Understanding with Environmental Protection Agency (EPA), each area must develop a Park Water Plan.
4. WHAT HAS BEEN DONE: A well and spring inventory has been completed for the Rincon Mountain Unit of the park and a similar inventory has been started for the Tucson Mountain Unit. This information has been collected to complete Statement of Claimant forms for response to the Department of Justice with regards to the State of Arizona Adjudication of the San Pedro River and in anticipation of the registration of all existing wells as required by the Arizona Groundwater Management Act of 1980. A cursory inventory of the water quality of the park's ground and surface waters has also been completed for those sites visited.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN:
 - A. An historical report on management of water resources in the park.
 - B. Classification of all surface waters by present and proposed uses.
 - C. An analysis of the present status of park water, including:
 1. Identification of water quality required to support specified uses and, where appropriate, to comply with or assist in establishing state water quality standards.
 2. Relationship of water quality to any threatened, known rare or endangered species indigenous to the park and the relationship of water quality to the protection of all natural resources.
 3. A bibliography of available information concerning the existing quality of park waters.
 - D. A description of proposed actions relating to management of park waters.
 - E. A detailed plan for monitoring the quality of park waters that will reveal existing water quality and significant trends.
6. LENGTH OF TIME NEEDED: Two years.
7. WHAT WILL HAPPEN IF NOT UNDERTAKEN: Damage or loss of water resources may occur.

8. WHAT ARE THE ALTERNATIVES: Do nothing.
9. PERSONNEL: Staff of Western Region, Division of Water Resources; Independent Consultants or other Federal Agencies and monument staff.
10. ADMINISTRATION AND LOGISTICS:

<u>Funding</u>	<u>1st</u>	<u>Year in Program Sequence</u>				<u>5th</u>
		<u>2nd</u>	<u>3rd</u>	<u>4th</u>		
Personal services			4,000	2,000		0
Other than personal services			8,000	6,000		0
Grand Total			12,000	8,000		
Funds available in park base	0	0	0	0		0
Funds requested from Regional Office			12,000	8,000		

On Form

10-237

Date Submitted:

April 1982

11. REFERENCES AND CONTACTS:

A. Division of Water Resources, Western Regional Office

12. DATE OF SUBMISSION: Revised - March 30, 1982.

CULTURAL RESOURCES MANAGEMENT

Overview and Needs

Management cannot begin obliteration and environmental rehabilitation of the numerous mining sites in the Tucson Mountain Unit until a historic significance survey, in terms of National Register criteria, is conducted for each mine and prospect hole, mining structures, mining roads, and overburden dumps. Tucson Mountain Unit wilderness landscapes are replete with ugly mining scars of old roads and mine dumps. These anachronistic features on wilderness lands need to be obliterated, and the areas restored to appear as part of the undisturbed desertscrub biotic community.

An archeological resources inventory in the Tucson Mountain Unit needs to be conducted for compliance with Executive Order No. 11593. About 3% of the Tucson Mountain Unit has been surveyed along major road and trail corridors.

The annual Papago Indian Saguaro Fruit Harvest in the Tucson Mountain Unit will be examined during the 1984 summer harvest season. A meeting with park staff and Indians on-site will give insights to the fruit harvest operation, camping area problems, harvest/campsite visitation by educational groups and other park visitors. Harvest camping has been in progress for seven years and needs to be studied objectively for improvement.

The list of Classified Structures for Saguaro National Monument is incomplete, and the National Register listings are incomplete. The museum catalog records for cultural materials are current.

Interpretation of cultural resources, both historic and prehistoric, is of secondary significance to the natural history and ecological relationships of Monument flora and fauna. The Archeological Overview of Saguaro National Monument is an excellent document and an adequate source for current prehistoric interpretive endeavors at Saguaro National Monument.

Cultural Resources Project Programming Sheet

Saguaro National Monument

December 1983

NATIONAL PARK SERVICE COSTS EXPRESSED IN \$1000

Area Pri- ority	Refer- ence No.	Project Title	Yr. 1		Yr. 2		Yr. 3		Yr. 4		Yr. 5		Form No. & Date
			BASE	NEW	BASE	NEW	BASE	NEW	BASE	NEW	BASE	NEW	
1.	H-1	Historic Resources Study Park General		58.0									03/73
2.	A-2	Inventory Archeological Survey - TMU		48.0									08/83

CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Saguaro National Monument, Western Region
2. PROJECT NAME AND NUMBER: Historic Resources Study (H-1).
3. STATEMENT OF PROBLEM: Prior to any environmental rehabilitation, obliteration, or removal projects at mining sites, old roads, dam structures, and building foundations, all such existing cultural features will be evaluated for historical significance in terms of National Register criteria for compliance with Executive Order No. 11593. Mine shafts which are fenced or will soon be fenced can then be rehabilitated to appear natural.

Human activities, other than Indian, occurred on monument lands prior to establishment in 1933 (Rincon Mountain Unit) and 1961 (Tucson Mountain Unit). Quicklime production, woodcutting, grazing, hunting, plant collecting, mining, logging and farming (Rincon Mountains), homesteading and other activities are all documented in the monument's historic resources file. To understand and interpret these historic activities, a synthesis of historic information from all available sources needs to be undertaken. Some interviews still need to be conducted for historic resource documentation.
4. WHAT HAS BEEN DONE: The park staff has compiled a historic resources file, and has conducted interviews with "old-timers."
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: The monument requires a general historic background study in a usable format. Review of source material is required to gain more knowledge about Manning Cabin, which is on the National Register, and to augment description and evaluation of sites which may have potential for nomination to the State Register. A background study and historical base map needs to be compiled with recommendations concerning management of man-made structures, especially those associated with mining. Special emphasis on grazing history should provide knowledge about past ecological conditions of the saguaro forests which will aid in management and interpretation of the park.
6. LENGTH OF TIME NEEDED: One year.
7. WHAT WILL HAPPEN IF NOT UNDERTAKEN: Park developments may not have adequate management guidelines for preservation of historical resources, in violation of Executive Order No. 11593. The historical aspect of the park's interpretive program will remain inadequate. If former woodcutting, plant collecting, and cattle grazing activities in the cactus forest could be quantified; then researchers and resource managers could more accurately predict natural ecosystem recovery based on man-caused factors of environmental change.
8. WHAT ARE THE ALTERNATIVES: Use existing information supplemented by opportunity gathered data.

9. PERSONNEL: Service and/or university personnel.

10. ADMINISTRATION AND LOGISTICS:

<u>Funding</u>		<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>	
Personal services	58,000	0	0	0	0	
Other than personal Services	0	0	0	0	0	
Grand Total	58,000					
Funds available in park base:	0	0	0	0	0	
Funds requested from Regional Office:	58,000					

On Form

Date Submitted:

10-238

September 1982

11. REFERENCES AND CONTACTS:

A. Historic resources file in naturalist division.

12. DATE OF SUBMISSION: June 10, 1982

CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Saguaro National Monument, Western Region.
2. PROJECT NAME AND NUMBER: Inventory Archeological Survey, Tucson Mountain Unit (A-2).
3. STATEMENT OF PROBLEM: The only survey in the Tucson Mountain Unit provided minimal coverage, and is adequate both as an inventory and for management purposes. An intensive survey of the area is necessary to identify sites and areas that need protection for preservation, and to learn the type and distribution of cultural resources for interpretation, and to satisfy the requirements of existing Federal legislation regarding historic resources preservation.
4. WHAT HAS BEEN DONE: A 1965 survey by Jack Zahniser recorded 29 sites. A 1962 stylistic study of some petroglyph sites was made by Cheryl White. Monument personnel have recorded several sites which indicate that Zahniser's survey omitted lithic workshops and hearths. Road and trail corridors were surveyed by Pima Community College archeologists in 1979.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: Conduct an inventory archeological survey to assess the numbers, kinds and locations of all cultural resources. Future research cannot proceed without a well designed and well executed inventory survey. Research design and road and trail corridors are to be included in the first year of work.
6. LENGTH OF TIME NEEDED: One year.
7. WHAT WILL HAPPEN IF NOT UNDERTAKEN: Management decisions will not be based on knowledge of cultural resources in violation of Executive Order No. 11593, and information for interpretive purposes will remain unknown.
8. WHAT ARE THE ALTERNATIVES:
 - A. Do not survey.
9. PERSONNEL: WACC and university personnel.

10. ADMINISTRATION AND LOGISTICS: .

<u>Funding</u>		<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>	
Personal services	43,000	0	0	0	0	
Other than personal Services	5,000	0	0	0	0	
Grand Total	48,000					
Funds available in park base	0	0	0	0	0	
Funds requested from Regional Office;	48,000					

On Form

10-238

Date Submitted:

March 1979

11. REFERENCES AND CONTACTS:

- A. Dr. Keith Anderson and Don Morris, Western Archeological and Conservation Center.
- B. Reports listed under Item # 4.
- C. Special Report by Ken Rozen in 1977: "A Comparative Analysis of Three Southwestern Lithic Samples with Special Reference to the Nature and Availability of Raw Materials."
- D. "Saguaro National Monument, An Archeological Overview" by V. K. Pheriba Stacy and Julian Hayden, June 1975.

12. DATE OF SUBMISSION: March 1979

